

# (CROMDI) REPRESENTATION OF MULTI-DIMENSIONAL INFORMATION

## CENTER

The Center for the Representation of Multi-Dimensional Information (CROMDI) was established to commercialize a new audio-visualization technology (IntuInfo) that facilitates the rapid and accurate analysis of large quantities of real-time data. CROMDI is an interdisciplinary team dedicated to the innovative representation of information and comprised of experts in Architecture, Art, Communication, Computer Science, Engineering, Finance, Mathematics, Medicine, Music, and Psychology. These diverse experts participate with their own unique perspectives and provide solutions to complex information design needs through a unique methodology and iterative process that has been refined over the years.

## TECHNOLOGY

Information is intuitively presented with specifically designed audio-visual objects that exhibit changes in color, shape, size, sound, etc., driven by data variables and their relationships. IntuInfo can maximize information per screen space, integrate many variables, enable comparison to normative values, simultaneously display present and historical data and zoom to global or local contexts. Because of its intuitive features, IntuInfo enables the user to recognize, understand and act on events faster, more accurately, with less mental effort, and with less training than is possible using existing data visualization technologies. In fact, the state of the art in many fields is to represent information with plots, pie charts, graphs, icons, and matrices that need extensive training and have limitations to the display of large quantities of data.

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## ACCOMPLISHMENTS

In the second year of funding CROMDI licensed the "cardiovascular display" to GE Medical Systems, formed a company called MedVis Inc. to commercialize the "drug display" and developed seven potential licensees. CROMDI received the First Place Award for "Best New Technology" from the Anesthesia Safety Association. Also, a NASA STTR grant was awarded to monitor the physiologic state of astronauts. CROMDI has received a DARPA seed grant to develop a pilot study and audio-visualization concepts for displaying the network status and resources to commanders. Also, a new audio-visual concept has been conceived (and is being patented) to support scheduling problems: this shall apply to both resource management and intelligence (detecting patterns of hackers, terrorists, etc.). A demo of financial displays was presented in New York City to 11 firms (investment banks, financial data vendors, and electronic exchanges) and elicited particular interest; CROMDI is preparing for a better financial market condition to cement a partnership. CROMDI has also recently started working with the Flying J refinery for a process control demo.

## Contact Information

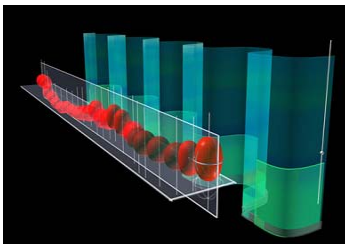
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# CROMDI (MULTI-DIMENSIONAL INFORMATION)

**ANESTHESIA.** Anesthesiologists face unexpected incidents during 20 percent of all procedures. One quarter of these incidents represent critical events posing significant danger to patients. Therefore, quick and accurate decisions are of major importance in anesthesia. The environment is stressful and the task is difficult, because 30 or more variables need to be monitored and mentally correlated and integrated. The CROMDI team developed working prototypes that significantly reduce recognition times for detecting, diagnosing and treating anesthesia-related critical events. Testing showed a statistically significant decrease in detection time in several critical scenarios: Clinicians detected anesthesia-related critical events sooner (3.1 vs. 5.5 min). Abnormal events were diagnosed more accurately (error rate 1.1% vs. 4.1%) \*Problems were corrected in one-third the time (17 sec vs. 45 sec) and drug delivery was better controlled (EC95 error 21% vs. 44%).

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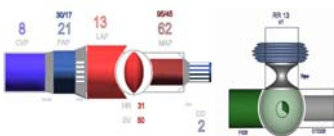
**FINANCE.** Investment professionals and individuals have access to a wealth of information about companies as well as real-time, historical and comparative market data. They want access to more data, but complain about too much data on their displays: this problem seems contradictory, and it can not be solved with current display technology. CROMDI developed prototypes that integrate large quantities of data in a way that will lead the user to make rapid and accurate decisions. Macro and middle level displays allow the trader to quickly view the performance of sectors and stocks in a portfolio. The micro level display allows the trader to analyze the current information on a single stock and quickly view its trend. A customer specified toolkit allows each user to determine the form of objects and select the financial variables to be displayed.



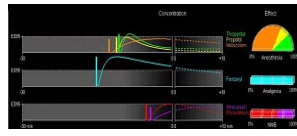
*IntuInfo+Anesthesia*



*Traditional Anesthesia Display*

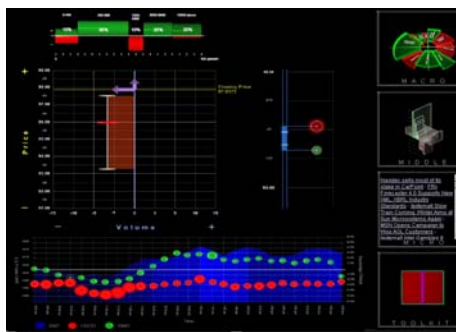


*Cardiovascular and Pulmonary*

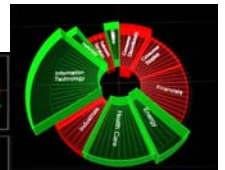


*Drug Display*

*IntuInfo+Finance*



*Micro-View displays three objects showing the current information on a single stock.*



*Macro-View  
Middle-View shows the same variables*

